

Public Health Manpower to Meet Changing Health Needs

THE 1954 National Health Forum, presented in connection with the 34th annual meeting of the National Health Council in New York City, March 24–26, 1954, was focused on changing factors in staffing America's health services. One of the five group discussions of the forum was concerned with the manpower needs for public health activities that emerge from changing emphases in Federal, State, and local governmental health programs.

The facts presented by the panel leading this discussion are summarized below. Following a review of major health problems of today and their effect on personnel requirements, particular attention is given to several fields of public health practice: environmental sanitation, research, accident prevention, mental hygiene, home care, and dental public health. Also included are the group's suggestions concerning problems of recruiting, training, retaining, and utilizing economically the health personnel on whom the Nation must rely for public health services.

In all the fields of activity discussed by this panel, the dynamic character of public health is clearly indicated. As one participant noted, no sooner is one health problem brought close to solution, than another arises to make even greater demands for knowledge and application of new public health techniques. Moreover, goals in public health are being gradually extended beyond the challenge of prolonging life to encompass the rewarding effort of pre-

venting the nonproductivity that almost invariably results from illness and infirmity.

Major Health Problems

Among the most important factors which must guide modern public health programs is, of course, the growing and aging population to be served. The civilian population of the United States increased from 150 million in 1950 to 158 million in 1954. By 1960, according to predictions, the population will consist of 169 million people, of whom one-fourth will be 50 or more years old.

The so-called chronic impairments of health now constitute the most challenging and urgent health problem. Research as to causes, prevention, and treatment needs to be continued. And widespread application of the best methods of control and amelioration now known needs to be accelerated. Scientific knowledge has increased faster than it has been possible to utilize such knowledge.

Preservation of mental health is another of today's outstanding health problems. Its importance is underscored by these two facts: The mentally ill occupy half the hospital beds in the United States (1); mental illnesses are responsible for more days of disability than any other cause, with the exception of heart disease (2).

Disabling illness from communicable diseases accounts for a loss of 100 million school days a year, according to estimates derived from data

provided by sickness surveys in the eastern health district of Baltimore (2). Estimates similarly derived from data provided by studies of sickness absenteeism in selected industries (3) indicate that illness from communicable diseases in the labor force costs \$2.25 billion each year in time loss alone. We need safer, better, and cheaper methods of preventing communicable disease. Better control measures must be developed for such diseases as tuberculosis, rabies, whooping cough, trichinosis, and brucellosis. Practical control measures are not yet available for such diseases as poliomyelitis, infectious hepatitis, encephalitis, and influenza. A program of vigilant surveillance is necessary to prevent such diseases as typhoid fever, malaria, smallpox, and diphtheria from again becoming major health problems.

Technological advances that have helped in conquering many sources of infection have, in turn, created new environmental problems: occupational and household hazards; ionizing radiations; stresses and strains of noise, speed, light, and crowded living; pollution of streams, lakes, and coastal waters by industrial wastes and chemical contamination; substances and methods used in processing food; maintenance of increasingly complicated food-handling equipment; substandard housing; sanitation in areas suffering from disaster; air pollution; and a host of others.

Today's leading health problems, particularly those associated with the long-term illnesses and a chemical environment, require a wide range of professional competence and create new needs for personnel. The modern health department must differ greatly from its counterpart of three decades ago. In addition to the usual "basic" personnel, health departments require, in increasing numbers, cardiologists, psychiatrists, psychologists, X-ray technicians, veterinarians, nutritionists, medical social workers, physical therapists, occupational therapists, dental hygienists, electrocardiograph operators, health biologists, health physicists, and the like.

In the chronic illness field, persons are needed who are capable of keeping abreast of all current related research of possible significance in preventing or controlling chronic diseases. The poliomyelitis problem certainly calls epidemiologists to the fore again. Moreover, all these

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problems directly or indirectly create the need for additional man-hours of work from sanitation personnel and public health nurses.

General Personnel Needs

Since 1947, the total number of State and local health workers has increased by about 7,600, or 16 percent, according to Public Health Service data. This growth has not occurred evenly, however, either geographically or among the several types of personnel. Many local health departments are still only skeleton organizations, operating on budgets of as little as 15 or 20 cents per capita. Others have budgets running as high as \$4 or \$5 per capita (4).

A countrywide survey conducted by the

Public Health Service disclosed that, as of April 1, 1951, 3,210 of the 32,764 State and local health department positions budgeted were vacant, or roughly 10 percent (5). Data for a few of the professional positions showed the following vacancy rates for budgeted positions: physicians, 19 percent; health educators, 20 percent; dentists, 21 percent; nutritionists, 16 percent; psychiatric social workers, 27 percent; and graduate nurses, 9 percent.

In the absence of comparable current data, the status of full-time health department physicians in New York State, exclusive of New York City, will serve as an isolated example. At present, omitting department institutional physicians, the number of such positions budgeted by State, county, and city health departments is 121. Of these positions, 20, or 16 percent, are vacant. Fortunately, 14 of these vacancies represent subordinate positions. Nine of the 20 vacancies are in the State health department and 11 in local health departments.

Bearing favorably on the shortage of public health personnel is the fact that schools of public health granted 1,905 master of public health degrees during the 5-year period 1947-48 through 1951-52 (6). Enrollment in these schools has been on the increase since 1950. The increase in number of staff-level public health nurses since 1937 has barely kept pace with population increases. We now have 1 nurse per 7,000 population, as compared with 1 per 7,500 population in 1937 (7).

Compensation of State-employed public health workers has risen also. Increases from November 1940 to August 1953 in median salaries ranged from 71 percent for directors of vital statistics to 136 percent for medical personnel, exclusive of State health officers. When adjustments are made for increased cost of living, as reflected by the Bureau of Labor Statistics' Consumer Price Index, these percentage increases drop, however, to minus 11 percent and plus 23 percent, respectively (8).

Personnel shortages have forced public health departments to review critically the relative needs and efficiency of program operation so that they may improve the utilization of personnel. Practicing physicians and visiting nurses are being utilized more advantageously than previously.

The shortage of public health personnel has also led to more critical public health job analysis. For example, medical health officers, in reviewing their duties, have recognized the desirability of employing nonmedical administrators for many tasks which they have been accustomed to doing themselves. Observations indicate that about a fourth of the time of a health officer is spent on activities which do not require medical judgment (9).

Perhaps most important is the critical evaluation of whole public health programs as well as of their component parts. Shortage of personnel may, for example, require that tuberculosis case finding be limited to efficient and thorough followup of household contacts of newly reported cases and to routine chest X-rays for all persons admitted to hospitals. When staffing facilities are limited, the most important things should be done first; the least important can be left to the last or omitted.

Environmental Sanitation

Since World War II, two significant changes have occurred with respect to sanitation personnel:

1. Environmental health responsibilities have been broadened. Such programs as the hygiene of housing, home safety, radiological health, smoke abatement, and others require competencies beyond those traditionally needed in the performance of sanitation work. In addition, changes in program emphasis toward community participation call for methods involving more and more the concepts of psychology, sociology, community organization, and political science. The growth of technology requires an increasing knowledge of the basic sciences for the solution of everyday sanitation problems.

2. Educational levels have risen. The number of master's degrees in sanitary engineering awarded each year will soon equal, or possibly even exceed, the number of bachelor's degrees granted. Even more important, while only 52 percent of those who receive the bachelor's degree stay in sanitary engineering work, 87 percent of the master's degree recipients remain in the profession (10).

Although salaries for sanitary engineers and

sanitarians have risen considerably over the past 4-year period 1948-52, "increases" in real income may be somewhat theoretical. Were changes in taxes and cost of living during the period 1940-48 to be considered, for example, the "increases" would probably turn out to be decreases in real income.

In 1952, median annual salaries for sanitary engineers and sanitarians in State health departments were \$5,333 and \$4,223, respectively, and in local health departments \$5,233 and \$3,364, respectively (11). During 1946, engineering graduates in public employment reported a median annual salary of \$4,725 (12). Sanitary engineers in local health departments did not reach this level until 1950—4 years later (13).

In 1953, State and local health departments in the States and Territories reported about 9,000 sanitation personnel. In the last 6 years, the number has increased by about 24 percent. Of these 9,000, about 8,000 were sanitarians and a little over 1,000 were sanitary engineers. While 85 percent of the sanitarians were employed in local departments, only 38 percent of the sanitary engineers were in such departments.

In local health departments, the use of sanitarians has increased by 30 percent since 1947, while the number of sanitary engineers has increased by 60 percent. Since 1947, virtually no change has occurred in the number of sanitarians and sanitary engineers employed in State health departments.

Research

In research, the manpower problems are divided broadly into two segments: first, the supply of manpower for medical research; second, the net effect of research findings themselves upon the quantity and the nature of the demand for all kinds of health manpower.

From 1947 to 1952, our total national medical research expenditures have risen from about \$88 million to \$173 million. "Total national medical research effort" means research in Government laboratories, in universities, in hospitals, in foundation laboratories, and in industry (14).

Federal expenditures have increased, roughly,

from \$28 million to \$73 million from 1947 to 1952. Over that period, the total private contributions for medical research have risen, in round figures, from \$60 million to \$100 million. About half the medical research in the country is done in universities, medical schools, hospitals, foundation laboratories, and other non-profit institutions; about a third, by industry; and about a fifth, in Government laboratories (14).

Three general factors in the postwar evolution of medical research have particularly important implications for manpower.

First, the shift in the general emphasis of medical research from the communicable to noncommunicable diseases has required, or at least involved, a relatively sharp increase in the area of investigation that relates to fundamental biology, biochemistry, and biophysics. Thus, an increasing portion of the total load of medical research is probably carried by people in the basic scientific disciplines, either by persons with a doctor's degree in those fields or by physicians who have had additional training in the biological and physical sciences.

Second, the size of the research unit, on the average, has doubtless increased, resulting in expansion not only of the number of senior investigators, but also of the supplemental people on the research team. Accordingly, we face quite severe shortages of highly trained technicians throughout the whole research area.

Third, most medical research is now either a full-time endeavor or is combined with teaching, though, of course, a great deal of clinical research is done by practicing physicians.

The Federal Government is active in medical research in two broad spheres: research done in Federal laboratories, such as those of the Veterans Administration, the Naval Medical Center, the Army Medical Center, the Air Force School of Aviation Medicine, and the Public Health Service; and the support of research outside Federal laboratories, primarily those of nonprofit organizations, through contracts and grants. In 1952, the Government spent about \$35 million for medical research in the first of these spheres and about \$38 million in the second (14).

An important aspect of Federal activities relating to medical research is that the Federal

Government is a producer as well as a consumer of medical research talent; directly, through the provision of fellowships and teaching grants to medical schools, universities, and individuals, and, indirectly, through the training of people engaged in research projects and the participation of Federal employees in the teaching programs of medical schools. A large number of graduate students now receive advance training, in effect, with the support of Federal grants or contracts.

The question might be raised as to how we have managed to staff a total national medical research effort which has approximately doubled since World War II. First, medical manpower at the end of the war was probably not as thoroughly saturated with research as was manpower in most physical sciences. Second, medical research has borrowed manpower from other disciplines. Part of the supply thus comes by subtraction from the total pool of trained scientific manpower. Another important factor, of course, is the net growth in the pool of persons holding doctor's degrees in the biological or physical sciences, part of whom have been available for medical research. The total national pool of doctors in the sciences has increased from about 32,000 to 46,000 since the war (15). Another part of the manpower, of course, has been supplied from the pool of physicians.

Medical research, moreover, is increasingly quantitative and accordingly requires increased and extremely expensive instrumentation. Part of the absorption of money, therefore, represents more dollars per person in medical research, rather than the expansion of the total manpower required to absorb the increased funds. The expansion of medical research from this point on will be more sharply affected by the manpower factor than it has been since the end of the war.

Probably about 12,000 investigators are now engaged in medical research. Of them, perhaps not more than 6,000 are physicians—or reduced to an equivalent full-time basis, perhaps about 4,000. With a supply of around 200,000 practicing physicians, the drain of medical research upon the pool of physicians otherwise available for medical care does not seem to be a very important matter.

On the other hand, the heavy load of medical research in medical schools poses an extremely complex problem relating to the training of people for the future. Certainly, the research function in the medical schools has expanded more rapidly since the end of World War II than has the training function. The absorption of people highly competent to teach as well as to conduct research into the research function seems to be the heart of the problem, rather than the diversion of physicians from medical care.

Accident Prevention

The leading causes of death are now noncommunicable diseases and accidents. Moreover, statistical summaries of fatal accidents in 35 metropolitan areas show that one-half of all such accidents have occurred at home (16).

Eight State health departments now have full-time staff members working on home safety. From 1 to 4 people in each of these States are using Kellogg Foundation grants to develop their programs. Three local health departments also have full-time staff members working on home safety.

Last year, home safety programs of a quality high enough to win merit awards were conducted by the School of Public Health at Michigan, the Minnesota Department of Public Health, and local public health departments at Cambridge, Mass.; Kalamazoo, Mich.; Madison, Wis.; Mansfield, Ohio; New York City; and San Jose, Calif.

The size of the accident prevention movement can be gauged by the fact that 13,000 representatives of industry and of local safety organizations gather in Chicago each year for a National Safety Congress.

Official State and local groups have been charged with responsibility for reducing motor vehicle accidents, industrial accidents, and even farm accidents, but, by and large, no official State or local organization has been made responsible for developing an official, tax-supported program for preventing home accidents. Therefore, the Home Safety Conference has invited public health departments to expand their programs in home safety (17).

Home safety is not the particular area of operation of any particular health discipline.

The pattern which has developed in health departments, so far as experts and departmental disciplines are concerned, has been that each of the various disciplines concerned in a department is represented on a department home safety committee, headed by anyone especially interested and able to point up the department's program. In many cases, the head is a public health engineer; in other cases, a public health nurse; in others, a public health educator or a public health or medical administrator, or the health officer himself.

What is needed is not a specialist, but a generalist who can integrate home safety in the total program. Home safety need not be a separate subject, but it should not be integrated out of existence.

Housing programs are usually in the sanitation division where they consider air, space, light, water supply, and other facilities, but more or less overlook home safety. Housing is one area in which greater attention could be centered on safety.

Mental Hygiene

In this country, mental hospitalization is not a responsibility of the public health agency, as it is in most other countries of the world. It may become so now that public health is tackling the tough problems of the chronic diseases, which frequently require individual treatment. If public health ever does accept the responsibility for mental hospitals, it will inherit a job that takes between 5 and 15 percent of the total of all State budgets. It will also inherit personnel shortages of 30 to 40 percent in psychiatrists, 60 to 70 percent in psychiatric nurses, about 25 percent in psychologists, and approximately 70 percent in psychiatric social workers (18).

Hospital psychiatry is mostly curative or custodial medicine. What about prevention and early treatment? It is impossible to calculate personnel shortages in this area because we have no standards of operation in regard to the population to be served. We know, however, that outpatient services, wherever they are available to the public, are always in demand, and that nowhere has it been possible to satisfy demands for diagnostic and treatment services. Esti-

mates indicate the need for a clinic team for each 100,000 people. Only about half that number is now available (19).

Everyone agrees that mental health concepts include respect for individual difficulties. These concepts recognize that social and interpersonal relationships may be the cause of disordered behavior, and that attitudes can best be changed in the setting of a friendly collaborative relationship, such as the confidential interview.

The attitude-changing effect of a confidential interview proves useful when the problem concerns an employee's misuse of sick leave, a head nurse's balkiness, a school child's stealing, or a young mother's anxiety over breath-holding spells. These general concepts have been referred to in connection with the need for education in psychology for engineers and sanitarians and the nurse's need for education in child growth and development, including, of course, personality and emotional development. Nursing has developed its own specialists in this area—the mental health nurse consultant.

Recognition of the usefulness of mental health techniques in the work of the health department and in voluntary agencies is usually spoken of in terms of the need for education. The need for more research is even greater, for research has had remarkable effects on the training of psychiatrists and auxiliary workers, psychologists, social workers, and nurses. With continued research and with greater contact between workers in the relatively new public health specialty of psychiatry and the longer-established workers in public health, new and demanding fields of investigation, as well as fields for mutual education, will open up.

For the most part, psychiatrists are not well enough educated in public health to grasp the problem of prevention of illness as their primary purpose. For the present at least, a tieup is needed between the educational work—the generalization of the work of the psychiatrist, the mental health expert, or the mental hygienist—and the clinical service. To obtain personnel and to maintain their professional interest, public health agencies must give the psychiatrist an opportunity to continue work directly with patients. Then the community demand must be more or less forced upon him. With increasing experience in public health

activities, the psychiatrist gradually gets the preventive viewpoint and begins to grasp educational opportunities.

The two big problems, the two major diseases that fill the mental hospitals, are schizophrenia and senility. General medicine does not give us much knowledge yet about how to stop the admission of senile patients to hospitals. We know some things about how to keep senile brains from giving rise to senile behavior, but we do not know how to prevent senility by doing anything in childhood. Moreover, we have no scientific evidence that anything done to a child will prevent schizophrenia.

Some children in school who are behavior problems can be helped through mental hygiene, to the relief of the school and of the family—to the relief of stress of all sorts within the family—and to make for more happy people. Taking the stress off people is what we all try to do in public health.

The behavior-disorder group is not a simple group, all of one kind. It includes persons with hereditary mental defects; those whose brains have been damaged by encephalitis, by meningitis, or by one of the other infectious processes; those whose brains have been damaged because their mothers had rubella or had too much anesthesia during childbirth; those with brains that have been damaged by a hemorrhage when they were born. A tremendous number of intensively difficult and exquisitely exact diagnostic problems in this area need to be solved. Then, perhaps, we will get more direct ways, better ways, of dealing with these problems.

Home Care

Few programs have caught the public's fancy as much as have home care programs. New York City has had home care programs since 1947. Last year, the visiting nurse services made about 70,000 visits to patients receiving home care. The patients had many types of illnesses, and they ranged in age from infancy up. Compared with regular caseloads, however, home care patients included a higher percentage in the older age categories and a higher percentage of men.

Some home care programs today are being

used to train medical students and nursing students. For medical students the goals are to learn the practice of medicine in the home and to learn the social aspects of medical care. We probably should add a third goal: learning to work on a home care team.

Home care is not only emptying hospital beds, it is providing services for many patients who will do much better under home care than in a hospital. Not only older people but also children can often get at home the kind of followup medical and nursing care that they need most.

We are moving to a point where we must recognize more and more that the public health nurse's job should include some care in the home and some teaching in the home. The program in New York City is pointed to the indigent, but the rationale for home care is equally applicable for the nonindigent. The National League for Nursing recently called a conference of people representing medicine, nursing, citizens groups, educators, and hospitals. The Arden House Report, representing the results of the conference, contains suggestions for a broader concept of home care (20).

Dental Health

Several factors in governmental programs are very likely to affect the need for dental personnel. Present military requirements are 1 dentist for every 525 members of the armed forces (21), whereas the number of civilian persons per civilian dentist is 2,100 (22). Another potential demand for dental services will arise if the military undertakes an expanded program of medical care and dental care for dependents of the armed forces or if there is any extension of the dental services provided to veterans.

Educational programs, conducted at all levels of government, also result in an increasing demand for dental services. At the present time, about 40 percent of the population visits the dentist in any given year (23). Twenty years ago, roughly 20 to 25 percent of the population visited a dentist during a year (24). Generally speaking, we have not improved the ratio of dentists to population that we had at that time (25).

As a result of a topical fluoride demonstration program conducted a few years ago by the Public Health Service, hundreds of programs were set up to provide topical fluorides to children and many existing dental health programs were expanded to include this service. These developments increased tremendously the demand for dental hygienists, a demand which has been partially met, however, by the establishment of several new schools of dental hygiene.

It is doubtful whether fluoridation of public water supplies will greatly affect the need for dental personnel within the foreseeable future, but it will, in time, reduce the need for corrective treatment of dental caries. The dental profession looks forward to being able to give increased attention to gum diseases, to orthodontic problems, and to other dental health problems, as the problem of dental decay becomes less acute. Development of fluoridation programs, however, requires a tremendous amount of time on the part of the dental personnel in State health departments, as well as sanitary engineering and laboratory personnel, who are helping to promote such programs and are assisting the communities in getting them under way.

Another significant change which has been somewhat stimulated by governmental programs is the increased use of auxiliary personnel. In 1950, 65.6 percent of the dentists employed one or more full-time assistants (23), whereas 2 years later, in 1952, more than 70 percent were using the services of auxiliary personnel (26). A 1950 survey of dental practice found that a dentist with one employee served 37 percent more patients than one with no employee and that a dentist with 2 employees served 69 percent more patients than the dentist who was unaided (23). These data refer to technicians, clerical personnel, dental hygienists, and chairside dental assistants. Techniques in the effective use of the latter type of auxiliary personnel have been demonstrated in studies by the Public Health Service, and these techniques are now being incorporated in the teaching programs of some dental schools and are being taught to practicing dentists through clinics and films. The demand for trained

dental assistants will no doubt continue to increase.

Another factor is the demonstration by the Public Health Service of the value of maintenance care programs. Two studies that have recently been completed, one in Woonsocket, R. I., and the other in Richmond, Ind., show that it takes 3 to 5 times as many professional man-hours to care for the accumulated dental needs resulting from neglect as it does to care for the dental needs of children on a year-to-year basis. Children who get dental care on a haphazard basis, just on occasion, lose eight times more teeth than children who get their care early and regularly.

General Trends and Solutions

Governmental health programs with their changing emphases have a significant influence on personnel requirements. One of the problems in obtaining personnel to staff the changing health programs is inadequate financial compensation. Although salaries have considerably increased dollarwise, many of these increases have not meant an actual increase in purchasing power. Compensation, therefore, remains a handicap in recruitment.

The immediate need for intensive efforts to recruit candidates for education in the health profession is recognized. Attempts to interest young people in choosing a career in one of the health fields perhaps should begin in the junior high schools and should be continued, of course, in the high schools and colleges.

Vacancies and shortages in terms of ideal personnel staffing requirements suggest the necessity of investigating further the extent of personnel needs in terms of service unit requirements rather than standard ratios to population.

Critical evaluation of staffing needs, particularly with reference to the possibility of utilizing less-skilled persons, can point the way toward better use of auxiliary personnel and can help get jobs done when the professional staff is limited.

Government-sponsored research, particularly that supported by the Federal Government, has expanded tremendously in recent years, tending to attract personnel for strictly research activities from the general pool from which is drawn

the staff for many health activities. On the other hand, the fellowship and training grants that are part of the research program help to fill the gaps created by withdrawal from the manpower pool.

In addition, research provides new means of preventing and treating illnesses, which force changes in health programs. These changes affect the kinds and numbers of personnel required in the health fields.

One of the relatively newer developments in health department activities is the emphasis on mental illness and the mental health program. In this field, the shortage of personnel is more acute than in any other.

Home care, as a function of the official health agency, is a rational development in view of the tremendous problem of chronic disease. Home care is a means of economy, not only in money but also in more effective use of professional personnel.

Expansion of the use of auxiliary dental personnel likewise offers hope of more nearly meeting the needs for dental health services despite the present shortage of professional personnel in dentistry.

REFERENCES

- (1) Hospital service in the United States. J. A. M. A. 152: 145 (1953).
- (2) Collins, S. D.: Sickness surveys. In *Administrative medicine*, edited by Haven Emerson. Rev. ed. New York, Thomas Nelson and Sons, 1951, pp. 527, 529.
- (3) Gafafer, W. M.: Industrial sickness absenteeism among males and females during 1950. With index of the previous publications of the series. Pub. Health Rep. 66: 1550-1552 (1951).
- (4) U. S. Public Health Service: Report of local public health resources, 1952. Public health personnel, facilities, and services in local areas. In preparation.
- (5) Haldeman, J. C., Cheney, B. A., and Flook, E.: Staffing of State and local health departments, 1951. Public Health Service Publication No. 279 (Public Health Monograph No. 13). Washington, D. C., U. S. Government Printing Office, 1953, p. 4.
- (6) Public health degrees and certificates granted in the United States and Canada, during the academic year, 1951-1952. Report of the Committee on Professional Education of the American Public Health Association. Am. J. Pub. Health 43: 216-219 (1953).
- (7) Tibbitts, H. G., and Levine, E.: Health manpower source book. 2. Nursing personnel. Public Health Service Publication No. 263, section 2. Washington, D. C., U. S. Government Printing Office, 1953, p. 60 (table 36).
- (8) U. S. Public Health Service: Salaries of State public health workers, August 1953. Public Health Service Publication No. 340. Washington, D. C., U. S. Government Printing Office, 1953, p. 8.
- (9) Graning, H. M., Ferguson, M., Cheney, B. A., and Leffingwell, A. M.: Activities of medical administrators in State health departments. Pub. Health Rep. 66: 619-629 (1951).
- (10) Lyon, W. A., and Miller, A. P.: Recipients of the master's degree in sanitary engineering. A quantitative study. Pub. Health Rep. 68: 717-728 (1953).
- (11) Fox, P. E.: Salary trends for public health workers in local health departments [from 1948 to 1952]. Pub. Health Rep. 69: 309-318 (1954).
- (12) Fraser, A.: The engineering profession in transition; A report of the Engineers Joint Council Committee on the 1946 Survey of the Engineering Profession. New York, The Council, 1947, p. 83 (appendix E).
- (13) U. S. Public Health Service: Salaries of local public health workers, April 1952. Public Health Service Publication No. 237. Washington, D. C., U. S. Government Printing Office, 1952, p. 6.
- (14) Ladimer, I.: Trends in support and expenditures for medical research, 1941-52. Pub. Health Rep. 69: 111-122 (1954).
- (15) Wolfe, D.: Supply of scientific manpower. In Proc. Second Conference on Scientific Manpower. 119th meeting of the American Association for the Advancement of Science, St. Louis, December 1952. Washington, D. C., National Science Foundation, 1953, p. 3.
- (16) National Safety Council: Accident facts. 1953 edition. Chicago, The Council, 1954.
- (17) An invitation to health departments. Home Safety Rev. 6: 10 (June-July 1949).
- (18) American Psychiatric Association: The psychiatrist: His training and development. Washington, D. C., The Association, 1953.
- (19) Council of State Governments: Training and research in State mental health programs. A report to the Governors' Conference. Chicago, The Council, 1953.
- (20) National League for Nursing: Report of the Conference on Public Health Nursing Care of the Sick at Home. New York, The League, 1953, 57 pp.
- (21) Current view of the military liability of dentists. [Report of the Council on Federal Dental Services of the American Dental Association.] J. Am. Dent. A. 48: 316-318 (1954).
- (22) American Dental Association. Bureau of Economic Research and Statistics: Unpublished memorandum, Feb. 9, 1954.

- (23) American Dental Association. Bureau of Economic Research and Statistics: The 1950 survey of the dental profession. Chicago, The Association, 1951.
- (24) Committee on the Costs of Medical Care: Medical care for the American people. The final report of The Committee. Chicago, University of Chicago Press, 1932, p. 11.

- (25) American Dental Association: Editorial. J. Am. Dent. Assoc. 42: 323 (1951).
- (26) The 1953 survey of dental practice. VI. Sources of dental income; Expenses of dentists; Auxiliary personnel. [Report of the Bureau of Economic Research and Statistics of the American Dental Association.] J. Am. Dent. A. 48: 448-452 (1954).

technical publications

Announcing . . . Transcriptions of Your Mental Health Radio Series

Public Health Service Publication No. 334. 2-fold leaflet. No sales stock.

Beginning in March 1953, the National Broadcasting Company, in cooperation with the National Institute of Mental Health, presented a series of 13 radio programs on mental health subjects, including adolescent, marital, and old age problems, mentally retarded children, psychosomatic illness, community attitudes toward the mentally ill, and rehabilitation of the mentally ill. These programs are now available to State and local organizations for broadcast or nonbroadcast use. This leaflet outlines the content of the programs and tells how to obtain them.

Bibliography of Occupational Health

Public Health Bibliography Series No. 9. Public Health Service Publication No. 300. 1954. By Frances L. Hyslop and W. M. Gafafer. 110 pages. 35 cents.

This comprehensive bibliography is the latest listing of occupational health and related publications issued by the Public Health Service from 1909 through part of 1953.

This bibliography provides a complete and continuing record for reference use. It contains voluminous

information on early pioneering studies and other contributions by the Public Health Service to the detection and control of occupational diseases. At the same time, by reflecting changes in subject matter from year to year, it affords an historical perspective of shifting interests in the field of occupational health and serves as an index of progress.

There are 1,938 entries listed. The book is organized under 15 subject headings such as chemistry, dentistry, dermatology, education, and so forth, and appropriately subdivided. The items have been listed chronologically under the subject headings. There are also subject and publication indexes.

Tuberculosis Beds in Hospitals and Sanatoria, April 1, 1953

Public Health Service Publication No. 337. 1954. 44 pages; tables. 35 cents.

As of April 1, 1953, there were 1,112 hospitals providing care for tuberculous patients, according to the eighth annual edition of the Index of Hospitals and Sanatoria with Tuberculosis Beds in the United States and Territories. Seven hundred and twenty-two of these hospitals provided 114,479 beds for the care of tuberculous patients. The remainder either have fewer than five tuberculosis beds, or they have

no specific number of beds set aside for such patients. In the continental United States, 1,086 hospitals were providing care for tuberculous patients, 700 of which have 109,569 beds. Five hundred and seventy-eight of these 700 hospitals are non-Federal and 122 are operated by the Federal Government.

Compared with the previous edition, the number of tuberculosis beds has increased by approximately 1,700 in the continental United States, and 650 in the Territories. Five non-Federal hospitals which were under construction in 1952 contributed 632 of the increase.

Data in this publication were obtained by means of a post card questionnaire sent directly to each of about 1,000 hospitals. Approximately 95 percent of those contacted replied. Information is analyzed as to type of hospital, ownership, and control, and is compared with data in the January 1, 1952, report. The hospitals are indexed by State, with the number of beds given for each institution.

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